

REMARKS

Claims 6-24 (4 independent and 19 total claims) remain pending in this Application. Reconsideration of the application and allowance of all pending claims is earnestly solicited.

35 U.S.C. § 102 Rejections

The Office rejected claims 21-24 under 35 U.S.C. § 102(b) as being anticipated by Keeth et al., U.S. Patent No. 5,430,615, issued July 4, 1995 ("Keeth"). Applicant respectfully traverses this rejection.

Keeth discloses a casing or frame 2 divided by internal walls 6 to have equal-sized compartments 10A-10G. Each compartment can receive a double-wide module 14 or two single-wide modules 16. Double-wide module 14 has a main circuit board assembly 20 and a backplane assembly 24. Main circuit board assembly 20 includes a main circuit board 28 attached to a front panel 32 at one end and a female portion or receptacle 36 (of a DIN connector) at the other end. Backplane assembly 24 has a male portion or header 40 (of the DIN connector) to connect with receptacle 36. Thus, main circuit board 28 can connect to backplane assembly 24. Col. 5-Col. 6.

However, Keeth fails to disclose a connector assembly "configured to integrate and allocate signals between said plurality of circuit integration modules" as recited in claim 21, or a connector assembly "configured to integrate and allocate signals between said plurality of circuit integration modules and said avionics cabinet" as recited in claim 22. In addition, Keeth fails to disclose "integrating and allocating signals between said plurality of circuit integration modules via said connector assembly" as recited in claim 23, or "integrating and allocating signals between said plurality of circuit integration modules and said avionics cabinet via said connector assembly" as recited in claim 24. Rather, Keeth merely discloses a conventional backplane assembly 24 for electrically connecting to main circuit board 28. Indeed, when "the main circuit board assembly is inserted into compartment 10F, the connector portion 36 of the main circuit board engages the connector portion 40 of backplane assembly 24 and reliable electrical connection is established between the main circuit board and appropriate points of the backplane assembly" (Col. 7). Accordingly, no where does Keeth disclose where backplane assembly 24 integrates and allocates signals between the modules 14, or between the modules 14 and casing

or frame 2. The main circuit board and the connector assembly 24 in Keeth merely establish an electrical connection.

Thus, Keeth fails to disclose one or more of the claimed elements, so that claims 22-24 are patentable over Keeth. To the extent mentioned by the Examiner, Keeth also fails to disclose one or more of the claimed elements in claim 21, so that claim 21 is also patentable over Keeth.

35 U.S.C. § 103 Rejections

Applicant respectfully believes that the § 103 rejections contained within the Office Action are now moot, since they apply to claims that depend from allowable independent claims, and are therefore patentable. Nevertheless, Applicant further distinguishes the references as follows.

The Office rejected claims 6-8, 11, 12, and 15-20 under 35 U.S.C. § 103(a) as being unpatentable over Martin, U.S. Patent No. 5,424,916, issued June 13, 1995 ("Martin") in view of Keeth. Applicant respectfully traverses this rejection.

Martin discloses a combination conductive and convective heatsink for use in an electronic module. A heatsink member 10 includes first and second major planar surfaces 12 and 14, respectively. Adjacent surfaces 12 and 14 is an object from which heat is to be transferred, where the object is an electronic circuit board. The conductive and flow-through heatsink uses heat pipes 18a-18d and 23 with flow-through passage areas 20a-20e. Heat pipes 18a-18d and 23 are used to conduct heat from surfaces 12 and 14 to a mounting rack 42. For example, heat pipe 18b is a conventional heat pipe having wicking material 22 located on the inner surface of the pipe. Alternatively, solid heat pipe 23 has carbon fibers 24 oriented to conduct heat from surfaces 12 and 14 to mounting rack 42. Conductive and convective heatsink 10a is used with electronic module 30 having first and second electronic circuit boards 32 and 34. The "module" in Martin (i.e., electronic module 30) works with conductive and convective heatsink 10a. The first and second electronic circuit boards 32 and 34 of electronic module 30 are placed on either side of conductive and convective heatsink 10a. In this way, electronic "module" 30 consists of two circuit boards, namely, first and second electronic circuit boards 32 and 34, electronic module connector 50, and connector pins 51. Electronic module 30 is mounted in mounting rack 42 having side walls 41 and 43, motherboard 44, and connectors 46a-46c. A "recess 48 guides

electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b". Col. 4 to Col. 5.

Claims 6 and 15

However, Martin fails to teach, advise, or suggest a connector assembly "configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet" as recited in claim 6 (and claims 7, 8, 11, and 12, which variously depend from claim 6) or "securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet" as recited in claim 15 (and claims 16-20, which variously depend from claim 15).

Rather, Martin is a multimode heatsink for an electronic module, where the heatsink can be cooled by conduction or convection. Col. 1, lines 5-11. Although Martin discloses an electronic module 30, as discussed above, Martin is concerned with the conduction and convection of the heatsink and not the electronics of electronic module 30. For example, Martin extensively discusses the convection of the heatsink. A cooling medium enters the mounting rack and is directed into the module. "The cooling medium then flows through the electronic modules" and exits the mounting rack". Martin continues by discussing the specific flow of the cooling medium, supplemental conductive mode cooling, and other specific aspects of each. Col. 5, line 50 to Col. 6, line 19. Thus, no where does Martin teach or suggest a direct electrical interface for integrating and allocating signals between circuit boards 32 and 34 and mounting rack 42 as proposed by the Office.

Furthermore, the present invention recognizes a problem with such conventional cabinets as follows:

With reference to Figure 1, a conventional IMA cabinet 100 houses a number of modules 102 containing printed circuit boards. The modules 102 of the conventional IMA cabinet 100 are interconnected to each other and connected to wiring harnesses of the airplane through a circuit interface located at the rear of the conventional IMA cabinet 100. The circuit interface, however, may take up considerable amount of space. For example, in one conventional IMA cabinet, the circuit interface may take up as much as 5 inches out of a total of 20 inches available for the entire cabinet. Additionally, the connections formed in the circuit interface of a conventional IMA cabinet are typically hard wired. Consequently, when the connections need to be reconfigured, repaired, or replaced, the connections formed in the circuit interface typically needs to be re-wired, which can be costly and time consuming.

Present Application, p. 2, lines 1-10. As such, the present invention recognizes a problem with convention electrical interfaces and wiring, which Martin fails to recognize, and consequently, fails to address. Thus, Martin fails to teach, advise, or suggest a connector assembly “configured to provide a direct electrical interface for integrating and allocating signals between said first and second circuit boards and said avionics cabinet” as recited in claim 6.

Still further, neither Martin nor Keeth suggest or show motivation for combining connector assembly 50 in Martin with front panel 32 of Keeth as proposed by the Office. Indeed, Martin is geared toward heat dissipation, whereas, Keeth is geared toward spacing of components. As such, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984) (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant’s disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify Martin in view of Keeth to include the missing claimed elements. Regardless, Martin in view of Keeth fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 6 and 15 are patentable over Martin in view of Keeth.

Claims 7 and 8

Martin also fails to teach, advise, or suggest “spacers separating said first and second circuit boards such that a gap between said first and second circuit boards is formed” as recited in claim 7. Heatsink member 10 is clearly not a spacer forming a gap between the first and second circuit boards as proposed by the Office. Rather, the conductive and flow-through heatsink uses heat pipes 18a-18d and 23 with flow-through passage areas 20a-20e to transfer heat from an object, namely the first and second circuit boards. Thus, Martin fails to teach, advise, or suggest one or more of the claimed elements, so that claim 7 would not have been obvious over Martin.

Martin further fails to teach, advise, or suggest where “said gaps are configured to align with ventilation holes in said avionics cabinet” as recited in claim 8. As discussed above,

electronic module 30 is mounted in mounting rack 42 having side walls 41 and 43, motherboard 44, and connectors 46a-46c. A “recess 48 guides electronic module 30 into mounting rack 42 until electronic module connector 50 and connector pins 51 engage and mate with mother board connector 46b”. Recess 48 also has an opening 54, which “provides access to flow-through passage 58 located in side wall 43 of electronic module mounting rack 42” (Col. 5). However, no where in Martin is the alleged “gap”, heatsink member 10, aligned with opening 54 in mounting rack 42. Rather, recess 48 guides electronic module 30 into mounting rack 42 via opening 54. Thus, Martin fails to teach, advise, or suggest one or more of the claimed elements, so that claim 8 would not have been obvious over Martin.

Claims 16 and 17

Martin also fails to teach, advise, or suggest “aligning slots on said module with guides on said avionics cabinet” as recited in claim 16, or “aligning guides on said module with slots on said avionics cabinet” as recited in claim 17. Recess 48, the alleged slot and guide, is a part of mounting rack 42. As such, the slots on the module cannot be aligned with a separate element, the guides on the cabinet in Martin, as proposed by the Office, because recess 48 is only on mounting rack 42. Consequently, Martin teaches away from the claimed invention in that it teaches a slot and guide element, namely, recess 48 on mounting rack 42 only and not on electronic module 30. Thus, Martin fails to teach, advise, or suggest one or more of the claimed elements, so that claims 16 and 17 would not have been obvious over Martin.

Claims 18-20

Keeth fails to teach, advise, or suggest “securing said module to said cabinet with a screw” as recited in claims 18 and 19, or where “said screw is a jack screw” as recited in claim 20. No where does Keeth or Martin disclose a screw for “securing said module in said avionics cabinet in order to provide a direct electrical interface between said module and said avionics cabinet” as recited in claim 15 (from which claims 18-20 variously depend). Applicant respectfully requests clarification by the Office as to which element(s) in Keeth and/or Martin is/are a screw or a jack screw. Thus, Applicant respectfully requests withdrawal of this rejection.

Claims 9 and 10

The Office rejected claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of Keeth as applied to claims 6-8 and 11-20 and in further view of McKenzie,

U.S. Patent No. 4,002,386, issued January 11, 1977 ("McKenzie"). Applicant respectfully traverses this rejection.

The McKenzie reference discloses a handle, which locks in place to prevent it from pinching fingers against the printed circuit boards since there is no face plate covering the PCB. As part of the locking mechanism, a plurality of pulling pins are disclosed that interact with slots in the handle to keep it in a locked position. Upon careful examination of the cited figures and the accompanying text at McKenzie, col. 2, lines 39-47, it is apparent that the handle is not retractable, but rather is attached to pins mounted in the printed circuit board. Slots in the handle move the handle over a pin to a keyhole 50/51 in the slot, which then locks the handle in position. As such, McKenzie teaches a handle arrangement that requires pins to be mounted directly on to the printed circuit board and handle ends, which lock the handle in position. Indeed, the McKenzie reference teaches away from the claimed invention in that the handle in McKenzie is made to lock into position. In addition, modifying the handle in McKenzie to include the missing claimed elements would render McKenzie improper for its intended purpose, namely to lock the handle in position. Consequently, even a combination of Martin in view of Keeth and in further view of McKenzie fails to teach, advise, or suggest the claimed invention as recited in claims 9 and 10.

Furthermore, Applicant submits that Martin and Keeth contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Martin in view of Keeth and in further view of McKenzie to include the missing claimed elements. Regardless, Martin in view of Keeth and in further view of McKenzie fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 9 and 10 are patentable over Martin in view of Keeth and in further view of McKenzie.

Claims 13 and 14

The Office rejected claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Martin in view of Keeth as applied to claims 6-8 and 11-20 and in further view of Tollbom,

U.S. Patent No. 5,793,614, issued August 11, 1998 ("Tollbom"). Applicant respectfully traverses this rejection.

Tollbom discloses an injector/ejector for an electronic module housing. A modular electronic system 10 has a chassis 12 and a removable module 14. The module 14 slides into and out of the chassis 12 along a slide axis 30. The module 14 has upper and lower fins 49, which slide within grooved guides 51 mounted on the upper and lower surfaces of a chassis chamber 50 of chassis 12.

However, Tollbom fails to teach, advise, or suggest "a first groove configured to interface with a first guide rail on said avionics cabinet" as recited in claim 13 or "a second groove configured to interface with a second guide rail on said avionics cabinet" as recited in claim 14. Rather, Tollbom discloses upper and lower fins 49 on the module 14, and not a groove configured to interface with a "guide rail on said avionics cabinet" as recited in claims 13 and 14.

In addition, the grooved guides 51 are mounted on chassis chamber 50 of chassis 12, and as such are not part of the module 14. The first and second grooves as recited in claims 13 and 14, respectively, are part of the module. Thus, Tollbom fails to teach, advise, or suggest the first and second grooves as recited in claims 13 and 14.

Further, Applicant submits that the cited art of record contains no teaching, suggestion, or motivation to combine the references as proposed by the Office. See ACS Hosp. Systems, Inc. at 1577 (teachings of the prior art can be combined to show obviousness only if there is some suggestion or teaching to do so). Accordingly, the Office is picking and choosing the various missing claimed elements in an attempt to recreate the claimed invention with Applicant's disclosure as the basis. Thus, without using impermissible hindsight reasoning, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine Martin in view of Keeth and in further view of Tollbom to include the missing claimed elements. Regardless, Martin in view of Keeth and in further view of Tollbom fails to teach, advise, or suggest the missing claimed elements. Therefore, claims 13 and 14 are patentable over Martin in view of Keeth and in further view of Tollbom.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that all of the pending claims are allowable over the prior art of record. Reconsideration of the application and allowance of all

pending claims is earnestly solicited. Should the Examiner wish to discuss any of the above in greater detail, then the Examiner is invited to telephone the undersigned at the Examiner's convenience.

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